164390

COMMONWEALTH OF PENNSYLVANIA
STD-502 REV. 4-83

# DESK MEMORANDUM

SUBJECT: Red Clay Creek - USFWS data

| TO | FROM |
|---|---|
| Harry Daw | Cindy Steele |
| DATE SENT: 1/13/87 | DATE NEEDED: |

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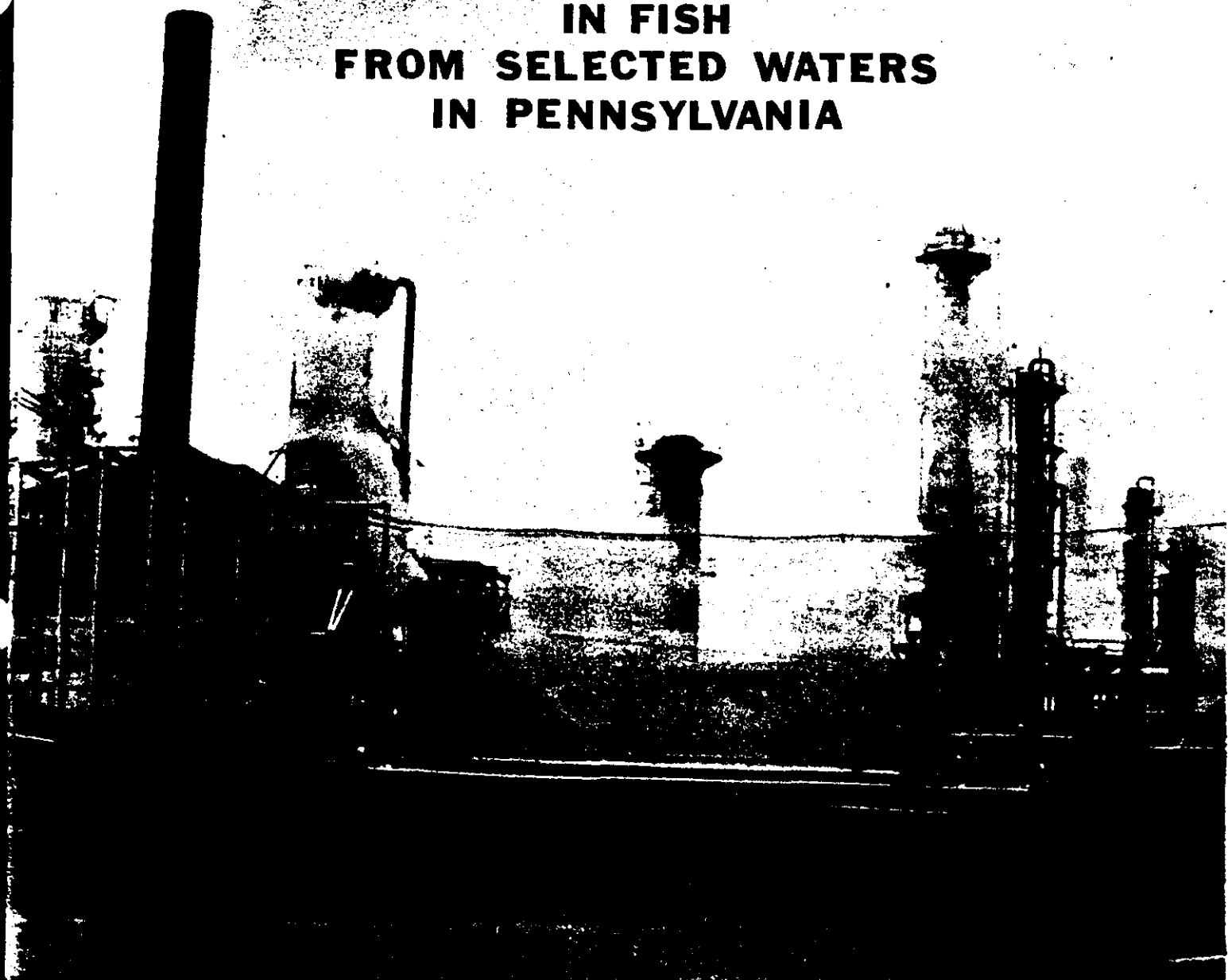
MESSAGE:

The 8-16-82 USFWS fish data was published in a rather thick document dated March '84. I've only included the data summary sheet and summary/conclusion pages. I've also included several pages out of a June '84 report compiled by BCM for the Chester Co Health Dept.

ORIGINAL
(Red)

# CONCENTRATIONS OF ENVIRONMENTAL CONTAMINANTS IN FISH FROM SELECTED WATERS IN PENNSYLVANIA



Prepared by
Department of the Interior
Fish and Wildlife Service

March 1984

ORIGINAL
(Red)

# CONCENTRATIONS OF ENVIRONMENTAL CONTAMINANTS IN FISH FROM SELECTED WATERS IN PENNSYLVANIA


Department of the Interior
U.S. Fish and Wildlife Service
State College, Pennsylvania

March, 1984

Prepared by: Janet M. Rompala, Flavia W. Rutkosky, and David J. Putnam
Project Leader: Charles J. Kulp

ORIGINAL
(Red)

# EXECUTIVE SUMMARY

This report describes the U.S. Fish and Wildlife Service's (FWS) monitoring of metals, organochlorine pesticides and PCB's in freshwater fish from selected Pennsylvania waters. The study was conducted as part of the FWS's Resource Contaminant Assessment (RCA) program, which provides for identifying contaminant problems and developing reports and recommendations to protect fish and wildlife resources.

Between September 1981 and September 1982 fish were collected by biologists from the FWS' State College Field Office (FWS) and Pennsylvania Fish Commission (PFC) personnel using portable or boat-mounted electrofishing equipment. Sites were selected in consultation with the PFC, the Pennsylvania Game Commission (PGC) and the PA Department of Environmental Resources (DER) field staff. The fish were analyzed for whole body concentrations of metals, organochlorine pesticides and PCB's.

The objectives of the study were to investigate the aquatic contaminant problem in Pennsylvania and to make a preliminary determination of contaminant levels in an attempt to evaluate potential threats to fish and wildlife resources. A review of the existing literature was conducted and SCFO data was reviewed by fish and wildlife biologists, aquatic biologists and researchers in the field of environmental contaminants.

Over 150 species of birds and mammals occur in or near aquatic environments in Pennsylvania and they consume aquatic organisms. These animals represent 48% of the mammal species and 54% of the bird species in Pennsylvania. The current difficulties inherent in the attempt to assess the health of a population through tissue residue data indicate the need for studies to quantify sublethal impacts of aquatic pollutants having significant ecological and economic consequences. Currently, residue data is of value as an indicator of the efficacy of existing regulatory programs and the need for additional remedial measures.

Arsenic, cadmium, copper, lead, mercury and zinc were present in some samples at levels equal to or in excess of the 1980-81 National Pesticide Monitoring Program (NPMP) geometric mean. The highest cadmium and lead concentrations were higher than the 1980-81 NPMP maximum value.

Maximum values for PCB's (as Aroclor 1254), DDT, DDD, DDE, dieldrin, oxychlordane, heptachlor epoxide, cis-nonachlor and hexachlorobenzene (HCB) exceeded 1980-81 NPMP geometric mean values. Mirex, lindane, alpha-BHC and trans-nonachlor maximum concentrations were higher than the NPMP maximum values.

Twenty-five streams had residue levels of organochlorine pesticides and or PCB's which equal or exceed the National Academy of Science (NAS)/National Academy of Engineers (NAE) criteria established to protect piscivorous wildlife. These waters include: Neshaminy Creek, Licking Run, Greenlane Reservoir, Skippack Creek, the Schuylkill River, Valley Creek, Manayunk Canal, Brandywine Creek (main steam and west branch), Red Clay Creek, and White Clay Creek in the Delaware River Basin. Waters in the Susquehanna River Basin include: Big Elk Creek, Mahantango Creek, Kishacoquillas Creek, Spring Creek,

Bald Eagle Creek, Slab Cabin Run, and Logan Branch. Ohio River Basin waters include: Connoquenessing Creek and the Allegheny, Shenango, Monongahela, Youghiogheny and Beaver Rivers.

Recommendations are made for further investigations of waters identified in this study as having contaminant problems. Future monitoring of additional streams is suggested.

Table C. Sampling Data

* Maximum Concentration

Values in parts per million wet weight

| STATION NO. | WATER | SPECIES | ALIQUOT COLLECTED | COLLECTION DATE | Al | As | Cd | Cr | Co | Cu | Hg | Mn | Ni | Mo | Pb | Se | Tl | V | Zn | PCB's 1260 | PCB's 1254 | PCB's 1242 | DDT | DDD | DDE | Dieldrin | Endrin | Toxaphene | Chlordane Alpha | Chlordane Gamma | Oxy Chlordane | Nonachlor Beta | Nonachlor Cis | Nonachlor Trans | Heptachlor | Heptachlor Epoxide | HCB | BHC Alpha | BHC Gamma | Mirex | Kepone |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | 1.0 | | | | | | | | | | | | | | 5.0 | | | 5.0 | | | 0.3 | 0.3 | 5.0 | 0.3 | | | | | | | | | 0.3 | | 0.1 | 0.3 |
| I-33 | Delaware Riv. | Smallmouth bass | 10 | 8-13-82 | | ND | ND | | | 1.6 | 0.1 | | | | 0.17 | 1.0 | | | 25.2 | 0.46 | ND | ND | 0.02 | 0.02 | 0.15 | 0.01 | ND | ND | ND | ND | ND | ND | 0.01 | 0.17 | ND | ND | ND | ND | ND | | | |
| I-45 | Delaware Riv. | White sucker | 10 | 9-15-82 | | ND | ND | ND | ND | 1.0 | ND | 5.5 | 355 | ND | 0.23 | 0.29 | 0.49 | | 19.6 | ND | ND | ND | ND | ND | ND | 0.01 | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | | | |
| I-44 | Delaware Riv. | Spot | 10 | 9-15-82 | | 0.28 | ND | 0.21 | ND | 1.1 | ND | 14.2 | 35 | ND | 0.19 | 0.37 | 0.42 | | 14.4 | 0.32 | ND | ND | ND | 0.13 | 0.23 | ND | ND | ND | ND | 0.04 | 0.03 | ND | ND | ND | 0.04 | ND | ND | ND | 0.02 | ND | | | |
| I-19 | Collins Run | Brown trout | 6 | 7-30-82 | | | ND | | | | ND | | | | | ND | | | 40.5 | ND | 0.22 | ND | ND | ND | ND | 0.03 | ND | ND | ND | 0.02 | 0.01 | ND | ND | ND | 0.03 | ND | ND | ND | ND | | | |
| I-17 | Hockamson Lake | Walleye | 9 | 7-30-82 | | | ND | | | | 0.10 | | | | | ND | | | 15.0 | ND | 0.12 | ND | ND | 0.01 | 0.01 | 0.01 | 0.01 | ND | ND | 0.01 | ND | ND | 0.01 | ND | 0.01 | ND | ND | ND | ND | | | |
| I-18 | Newsome Creek | Smallmouth bass | 10 | 7-30-82 | | | ND | | | | 0.25 | | | | | ND | | | 18.2 | 0.12 | ND | ND | 0.02 | 0.06 | 0.24 | 0.05 | ND | ND | 0.47 | ND | 0.02 | ND | 0.04 | 0.76 | ND | ND | ND | ND | | | |
| I-20 | Licking Run | Redbreast sunfish | 10 | 8-6-82 | | | ND | | | | ND | | | | | 1.9 | | | 29.9 | 0.76 | ND | ND | 0.03 | 0.08 | 0.13 | ND | ND | ND | ND | 0.30 | ND | ND | ND | 0.01 | 0.22 | ND | ND | ND | ND | | | |
| I-22 | Greenlane Res. | Largemouth bass | 10 | 6-24-82 | | | ND | | | | 0.12 | | | | | ND | | | 14.0 | 0.84 | ND | ND | 0.03 | 0.11 | 0.86 | 0.01 | ND | ND | ND | ND | ND | ND | 0.01 | 0.26 | ND | ND | ND | ND | | | |
| I-21 | Skippack Creek | Redbreast sunfish | 10 | 8-13-82 | | ND | ND | | | 0.69 | ND | | | | ND | 0.51 | | | 21.0 | 0.16 | ND | ND | 0.02 | ND | 0.11 | 0.05 | ND | ND | 0.14 | ND | 0.02 | ND | 0.02 | 0.82 | ND | ND | ND | ND | | | |
| I-11 | Schuylkill Riv. | White sucker | 5 | 6-22-82 | | | 0.05 | | | | 0.08 | | | | | 0.92 | 0.45 | | 23.2 | | | | | | | | | | | | | | | | | | | | | | |
| | | Smallmouth bass | 5 | 6-23-82 | | ND | | | | 0.70 | 0.18 | | | | | ND | 0.45 | | 22.9 | 2.36 | ND | ND | 0.04 | 0.04 | 0.20 | 0.02 | ND | ND | 0.02 | ND | 0.01 | ND | 0.03 | 0.05 | ND | ND | ND | ND | | | |
| I-10 | Schuylkill Riv. | White sucker | 10 | 6-22-82 | | | 0.08 | | | | 0.14 | | | | | 1.2 | 0.46 | | 35.7 | 2.51 | ND | ND | 0.06 | 0.07 | 0.20 | 0.03 | ND | ND | 0.05 | 0.02 | | ND | 0.03 | 0.05 | ND | ND | ND | ND | | | |
| I-12 | Schuylkill Riv. | Smallmouth bass | 10 | 6-22-82 | | | 0.05 | | | | 0.17 | | | | | ND | 0.68 | | 21.0 | 2.82 | ND | ND | 0.03 | 0.04 | 0.22 | ND | ND | ND | 0.01 | | 0.01 | ND | 0.02 | 0.04 | ND | ND | ND | ND | | | |
| I-13 | Schuylkill Riv. | Smallmouth bass | 10 | 6-24-82 | | | 0.06 | | | | 0.17 | | | | | 0.51 | 0.61 | | 24.0 | 1.05 | ND | ND | ND | ND | ND | ND | ND | ND | 0.01 | ND | ND | ND | ND | 0.02 | ND | ND | ND | ND | | | |
| I-36 | Valley Creek | Brown trout | 6 | 8-13-82 | | 0.12 | ND | | | 4.9 | ND | | | | | ND | 0.65 | | 34.1 | 1.62 | ND | ND | 0.01 | 0.02 | 0.17 | 0.07 | ND | ND | 0.12 | ND | 0.01 | ND | 0.01 | 0.23 | ND | ND | ND | ND | | | |
| I-21 | Manayunk Canal | Largemouth bass | 10 | 8-5-82 | | | ND | | | | ND | | | | | ND | | | 18.0 | 1.73 | ND | ND | 0.03 | 0.08 | 0.22 | 0.03 | ND | ND | ND | ND | 0.02 | ND | 0.05 | 1.55 | ND | ND | ND | 0.02 | ND | | | |
| I-34 | U. Br. Brandywine Creek | Smallmouth bass | 7 | 8-12-82 | | ND | ND | | | 0.66 | 0.16 | | | | | ND | 0.50 | | 26.0 | 2.39 | ND | ND | 0.02 | 0.04 | 0.26 | 0.05 | ND | ND | 0.12 | ND | 0.02 | ND | 0.03 | 0.82 | ND | ND | ND | ND | | | |
| I-35 | L. Br. Brandywine Creek | Smallmouth bass | 7 | 8-12-82 | | ND | ND | | | 0.95 | 0.22 | | | | | ND | 0.62 | | 20.0 | 1.70 | ND | ND | 0.02 | 0.07 | 0.41 | 0.02 | ND | ND | 0.35 | ND | 0.02 | ND | 0.03 | 0.8 | ND | ND | ND | ND | | | |
| I-25 | Red Clay Creek | White sucker | 5 | 8-16-82 | | ND | ND | 0.10 | ND | 1.7 | ND | 18.4 | 435 | ND | 0.34 | ND | 0.51 | | 24.6 | 6.5 | ND | ND | 1.50 | 1.25 | 1.46 | 0.03 | ND | ND | 0.14 | 0.12 | 0.03 | ND | 0.09 | 0.21 | 0.03 | 0.03 | ND | 0.04 | 0.07 | | | |
| I-32 | White Clay Creek | White sucker | 5 | 8-16-82 | | | | | | | | | | | | | | | | 0.08 | ND | ND | 0.31 | 0.18 | 0.29 | 0.02 | ND | ND | 0.22 | 0.22 | ND | ND | 0.03 | 0.27 | ND | ND | ND | ND | ND | | | |
| | | Brown trout | 5 | 8-16-82 | | 0.15 | ND | | | 3.6 | ND | | | | ND | 0.52 | | 35.5 | | | | | | | | | | | | | | | | | | | | | | |
| III-30 | Big Elk Creek | White sucker | 5 | 8-16-82 | | | | | | | | | | | | | | | | 0.06 | ND | ND | 0.08 | 0.04 | 0.12 | 0.02 | ND | ND | 0.21 | 0.16 | ND | ND | 0.01 | 0.30 | ND | 0.01 | 0.02 | ND | ND | | | |
| | | Brown trout | 4 | 8-16-82 | | 0.11 | ND | | | 3.0 | ND | | | | ND | 0.38 | | 36.6 | | | | | | | | | | | | | | | | | | | | | | |
| III-9 | Manenagua Creek | Rockbass | 7 | 7-20-82 | | 0.32 | | | | 3.2 | 0.25 | | | | | ND | 0.37 | | 20.9 | 0.97 | ND | ND | ND | 0.01 | 0.09 | ND | ND | ND | ND | ND | ND | ND | ND | 0.03 | ND | ND | ND | ND | ND | | | |
| III-8 | Wissahickon Creek | Rockbass | 5 | 7-19-82 | | ND | | | | 1.8 | 0.11 | | | | | ND | 0.31 | | 22.7 | 0.54 | ND | ND | ND | ND | ND | 0.01 | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | | | |
| III-48 | Juniata River | Smole class | 3 | 7-19-82 | | 0.37 | | | | | | | | | 0.94 | ND | | | | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | | | |
| III-7 | Juniata River | Rockbass | 6 | 7-19-82 | | 0.05 | 0.04 | ND | | | 0.15 | | | ND | 0.17 | 0.54 | | | | 0.42 | ND | ND | ND | ND | ND | 0.03 | ND | ND | ND | ND | ND | ND | ND | ND | 0.02 | ND | ND | ND | ND | | | |
| III-13 | Bald Eagle Creek | Black crappie | 10 | 8-11-82 | | 0.12 | ND | ND | | | 0.10 | | | | ND | 0.39 | | | 32.3 | ND | 0.12 | ND | ND | ND | ND | 0.01 | ND | ND | ND | ND | ND | ND | ND | ND | 0.01 | ND | ND | ND | ND | 0.01 | | |
| III-14 | Spyers Dam | Black crappie | 3 | 8-11-82 | | 0.27 | ND | ND | ND | 0.28 | 0.06 | 1.3 | 319 | ND | ND | ND | 0.23 | ND | ND | 17.2 | ND | 0.20 | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | 0.009 |
| III-18 | Spring Creek | Brown trout | 3 | 9-10-80 | | 0.05 | 0.01 | ND | ND | 4.5 | 0.14 | 0.71 | 306 | 50 | ND | ND | 0.54 | ND | ND | 23.8 | ND | 0.80 | ND | ND | ND | ND | 0.01 | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | 0.58 | 0.14 |
| III-1C | Bald Eagle Cr. | White sucker | 5 | 9-14-81 | | 0.05 | 0.03 | ND | ND | 1.3 | 0.12 | 5.4 | 305 | 90 | ND | 0.2 | 0.21 | ND | ND | 20.9 | ND | 0.40 | 0.14 | ND | ND | ND | 0.01 | | ND | ND | 0.40 | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | 0.008 |
| III-10 | Spring Creek | Brown trout | 6 | 9-14-81 | | 0.02 | ND | ND | ND | 4.2 | 0.32 | 0.46 | 298 | ND | ND | ND | 0.45 | ND | ND | 22.2 | ND | 1.21 | 0.41 | ND | ND | ND | 0.40 | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | 0.003 |
| III-11 | Slab Cabin Run | White sucker | 5 | 9-14-81 | | 0.05 | 0.03 | ND | ND | 1.1 | 0.43 | 1.4 | 317 | ND | ND | 0.4 | 0.25 | ND | ND | 24.2 | ND | 0.56 | 0.34 | ND | ND | ND | 0.46 | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | 0.005 |
| III-3 | Logan Branch | Brown trout | 8 | | | 0.01 | 0.02 | | | 3.1 | 0.05 | | | | 0.21 | 0.45 | | | | ND | 1.39 | ND | ND | ND | ND | 0.04 | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | | | |
| III-4 | Buffalo Run | Brown trout | 10 | 7-8-82 | | 0.03 | | | | 3.6 | 0.05 | | | | ND | 0.68 | | | 33.5 | ND | 0.23 | ND | 0.02 | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | | | |
| III-2A | Spruce Creek | Brown trout | 8 | 6-23-82 | | ND | ND | | | | ND | | | | ND | 0.56 | | | | 0.12 | ND | ND | ND | ND | 0.03 | ND | ND | 0.20 (estimate) | ND | ND | ND | ND | 0.01 | ND | ND | ND | 0.04 | ND | | | |
| I-24 | Links Run | Brown trout | 7 | 8-17-82 | 7.6 | | ND | ND | | | | | | | ND | | | | 31.1 | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | | | |
| | N. Br. Clarion | White sucker | 10 | | | | ND | | | | ND | 28.6 | | | 0.22 | ND | 0.28 | | 22.7 | ND | ND | ND | ND | ND | ND | 0.01 | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | | | |
| | Lake Somerset | Bluegill | 5 | 8-12-82 | | | | | | | | | | | | | | | | ND | ND | ND | ND | ND | ND | 0.02 | ND | ND | ND | ND | ND | ND | ND | ND | 0.04 | ND | ND | ND | ND | | | |
| | | Pumpkinseed | 5 | | | ND | ND | | | 0.79 | ND | | | | ND | | | | 21.8 | | | | | | | | | | | | | | | | | | | | | | |
| | Allegheny Riv. | Redhorse | 8 | 7-16-82 | | | 0.06 | 0.26 | | | 0.13 | | | | | | | | 18.0 | ND | 0.51 | ND | 0.08 | 0.01 | 0.02 | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | | | |
| | French Creek | Golden redhorse | 10 | 8-9-82 | | | ND | | | | 0.35 | | | | | ND | | | 23.7 | ND | 0.28 | ND | 0.08 | 0.01 | 0.08 | ND | ND | ND | ND | 0.01 | ND | ND | 0.01 | ND | 0.01 | ND | ND | ND | ND | ND | 0.04 | | |
| | Redbank Creek | Golden redhorse | 10 | 8-27-82 | 183 | | ND | ND | | | ND | 22.0 | | | 0.41 | ND | 0.33 | | 20.0 | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | | | |
| | Mahoning Creek | Redhorse | 10 | 8-27-82 | 125 | | ND | | | | ND | 49.0 | | | 0.29 | ND | 0.84 | | 20.0 | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | | | |
| | Pymatuning Res. | Largemouth bass | 3 | 8-9-82 | | | | | | 0.60 | ND | | | | | | | | | ND | ND | ND | ND | ND | ND | 0.01 | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | | | |
| | | Black crappie | 3 | 8-10-82 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Shenango River | Hog sucker | 8 | 8-11-82 | | | | | | 0.74 | | | | | 0.84 | | | | 47.0 | ND | 3.06 | ND | 0.04 | 0.02 | 0.02 | ND | ND | ND | 0.01 | 0.01 | ND | 0.04 | ND | 0.01 | ND | ND | ND | ND | ND | | | |
| | Beaver River | Carp | 6 | 8-10-82 | | ND | 0.15 | | | 1.9 | ND | | | | 2.8 | 0.40 | | | 86.3 | 2.64 | ND | ND | ND | 0.04 | 0.16 | ND | ND | ND | 1.09 | 0.97 | ND | ND | 0.01 | 0.93 | 0.04 | 0.01 | 0.09 | ND | ND | | | |
| | Conneaumessing Creek | Hog sucker | 10 | 8-11-82 | | ND | ND | | | 1.5 | ND | | | | ND | | | | 30.9 | 0.47 | ND | ND | 0.02 | 0.03 | 0.08 | 0.02 | ND | ND | 0.44 | 0.22 | ND | ND | 0.02 | 0.61 | 0.02 | ND | ND | ND | ND | 0.03 | | |
| | North Fork | White sucker | 5 | 8-11-82 | | ND | ND | | | 1.0 | ND | | | | ND | | | | 21.8 | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | | | |
| | Little Beaver R. | Hog sucker | 5 | 8-11-82 | | | | | | | | | | | | | | | | 0.16 | ND | ND | ND | 0.01 | 0.03 | 0.01 | ND | ND | 0.04 | ND | ND | ND | 0.08 | ND | ND | ND | ND | ND | | | |
| | Monongahela Riv. | Bass | 3 | 8-26-82 | | | | | | | | | | | | | | | | 1.31 | ND | ND | ND | ND | 0.08 | ND | ND | ND | 0.09 | 0.06 | 0.04 | ND | 0.04 | 0.13 | ND | ND | ND | ND | | | |
| | | Carp | 3 | | | | 0.35 | | | | | | | | 1.8 | 1.3 | | | | | | | | | | | | | | | | | | | | | | | | |
| | Youghiogheny R. | Carp | 3 | 8-26-82 | | | ND | 0.10 | | 1.1 | ND | 4.0 | 318 | ND | 0.18 | 0.10 | 0.64 | | 50.7 | ND | 1.62 | ND | ND | ND | ND | 0.10 | 0.08 | ND | ND | 0.13 | 0.13 | ND | ND | 0.05 | 0.14 | ND | 0.02 | ND | ND | ND | | |
| | Monongahela Riv. | Bluegill | 3 | 8-25-82 | | | ND | ND | | 0.53 | ND | 13.7 | 307 | ND | 0.24 | ND | 0.25 | | 15.8 | 0.19 | ND | ND | ND | ND | ND | 0.01 | ND | ND | ND | ND | ND | ND | ND | ND | 0.02 | ND | ND | ND | ND | ND | | |

ORIGINAL (Red)

ORIGINAL
(Red)

Fish were collected from 48 sites in Pennsylvania and analyzed for whole body concentrations of selected metals, organochlorine pesticides and polychlorinated biphenyls (PCBs).

Residue concentrations of arsenic, cadmium, copper, lead, mercury and zinc were present in some samples at concentrations equal to or in excess of the 1980-81 National Pesticide Monitoring Program's (NPMP) geometric mean. The highest cadmium and lead levels found in this study were higher than the 1980-81 NPMP maximum.

State College Field Office maximum values for PCBs (as Aroclor 1254), DDT, DDD, DDE, dieldrin, oxychlordane, heptachlor epoxide, cis-nonachlor and HCB exceeded 1980-81 NPMP geometric mean values. Mirex, lindane, alpha-BHC and trans-nonachlor maximum levels were higher than the NPMP national maximum values.

## Summary/Recommendations

Aluminum analysis was conducted on samples taken from streams where surface mining impacts were suspected. Aluminum did not appear to be a problem in these streams; however, further monitoring should be conducted in streams impacted by coal mining and in unbuffered streams affected by acid rain.

Arsenic levels were lower than recently reported levels from Maryland, Virginia and North Carolina; however, sampling stations on both the Delaware and Schuylkill Rivers had levels which exceeded the 1980-81 NPMP national geometric mean. This undoubtedly reflects the industrialized nature of these rivers.

Delaw

Cadmium was detected in fish from the Schuylkill, Monongahela and Beaver Rivers at levels which exceeded the 1980-81 NPMP national geometric mean. Cadmium is extremely toxic to fish and wildlife and the residue levels detected in the Schuylkill which exceeded the 1980-81 NPMP maximum levels may represent chronic toxicity conditions for fish. Further monitoring efforts should be conducted to identify the source(s) of cadmium where the residue levels exceed 0.1 ppm.

Schuylkill

Chromium residue levels were low in comparison to other comparable studies, and lower than levels reported in edible portions from an unpolluted Massachusetts river. Because chromium does not bioaccumulate through the food web, fish-eating wildlife will not be at risk if chromium effluent limits are enforced.

Cobalt does not biomagnify and is very rapidly adsorbed onto suspended solids and sediment. No cobalt was detected in any of the fish analyzed. Further cobalt monitoring does not seem to be warranted unless there is evidence of a significant increase in ambient water concentrations.

Copper residue levels were low in comparison to other whole fish studies, even though many SCFO values exceed the 1980-81 NPMP national geometric mean. Future copper monitoring should focus on waters where copper sulfate is routinely applied as an aquatic herbicide.

ORIGINAL (Red)

Lead residue levels from the Beaver River were higher than the 1980-81 NPMP maximum value. Several other values exceed the 1980-81 NPMP national geometric mean value. Much higher levels have been reported by PA DER and since lead is not known to accumulate in fish muscle tissue, the high levels reported by PA DER in edible portions suggest the need for further monitoring of lead.

Magnesium toxicity has received little study, but existing data suggest that toxicity is very low. Routine analysis for magnesium will be eliminated from future SCFO monitoring efforts.

Manganese is generally insoluble in water under most conditions and it is not considered to be toxic to fish, although some evidence exists which indicates increased mortality in rainbow trout. The highest levels of manganese were reported in samples from waters impacted by acid mine drainage. Future monitoring for manganese will be focused on streams with suspected or known acid mine impacts and areas where bottom water releases from reservoirs occur.

Mercury residue levels were above the 1980-81 NPMP national geometric mean in 15 samples. These same values were within the range reported for edible portions from an unpolluted New England river, suggesting that mercury does not represent a current problem. However, because of the known toxicity of mercury, future monitoring should include mercury analyses.

Nickel residues were highest in fish taken from waters impacted by acid mine drainage. Conflicting data exist on the toxicity of nickel to fish, but it is not reported to bioaccumulate. SCFO nickel levels do not appear to represent a problem and future sampling will continue to focus on waters with known acid mine drainage.

Selenium residues exceeded the 1980-81 NPMP national geometric mean in 18 samples. The level reported from the Monongahela River is especially high for a flowing water system in an area which contains low selenium levels in rock and soils. Selenium is toxic to fish at high concentrations and 3 mg/kg of dietary selenium has been shown to be toxic to small mammals. Further monitoring should be conducted on the Monongahela along with any backwaters and downstream reservoirs.

Thallium was not detected at any of the sites sampled. Thallium is considered to be highly toxic to fish and further monitoring efforts should sample for this metal in both agricultural and industrial areas.

Vanadium was not detected in any samples. Vanadium can be toxic to fish but does not appear to bioaccumulate. SCFO sampling for vanadium was restricted to one stream; however, further sampling efforts should sample for vanadium especially in waters which may be impacted by power plants, steel manufacturing and textile dyeing.

Zinc residue levels exceeded the 1980-81 NPMP national geometric mean at 21 sampling sites. Zinc is known to be more toxic to fish in soft water. Further monitoring should be conducted in soft water areas.

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BHC - Alpha- and gamma-BHC were detected at one site. The alpha-BHC level found in Red Clay Creek was equal to the 1980-81 NPMP maximum value. Gamma-BHC (lindane) is the most toxic to fish and the level reported from Red Clay Creek exceeds the 1980-81 NPMP maximum value and the NAS/NAE criteria. Lindane is known to disappear rapidly from aquatic systems and its detection in fish is a cause for concern. Although lindane production is banned in the United States, the use of this pesticide is not. The presence of lindane residues may be the result of improper use or disposal and further monitoring should be conducted on Red Clay Creek to identify the source(s).

Chlordane (alpha, gamma and oxy isomers) were detected at sites in the Delaware, Susquehanna and Ohio River Basins. Values for the alpha and oxy isomers exceed the 1980-81 NPMP national geometric mean. SCFO maximum levels were more than two times the maximum levels from comparable studies. Chlordane levels exceed NAS/NAE criteria in Neshaminy Creek (I-118), Licking Creek (I-20), Skippack Creek (I-31), Valley Creek (I-36), Brandywine Creek (mainstem and West Branch, I-35 and I-34), Red Clay Creek (I-25), White Clay Creek (I-30), Big Elk Creek (III-30), Connoquenessing Creek (V-26), and the Beaver, Monongahela and Youghiogheny Rivers (V-28, V-41, V-40).

DDT (and metabolites) - DDT and its metabolites DDD and DDE were found at 20, 24 and 42 sites, respectively, indicating the widespread occurrence of this pesticide in Pennsylvania waters. DDT levels exceeding 0.5 ppm or exceeding metabolite levels indicate recent DDT use. Buffalo Run (III-4) and Red Clay (I-25) and White Clay (I-32) Creeks had DDT levels which indicate recent contamination. The PA DER plans to conduct further monitoring of Red Clay Creek to determine the source(s) of DDT. Total DDT residues exceed NAS/NAE criteria at two sites, Red Clay Creek (I-25) and Greenlane Reservoir (I-22).

Dieldrin use has been restricted in the United States since 1977. Dieldrin residue levels from three sampling locations (Neshaminy Creek, I-18, Skippack Creek, I-31; and Valley Creek, I-36) were above the 1980-81 NPMP national geometric mean. Because of the known toxicity of dieldrin, further monitoring should be conducted.

Endrin - No endrin was detected in any fish samples collected for this study, paralleling the findings of the 1980-81 NPMP.

Heptachlor and heptachlor epoxide residue concentrations were within the ranges reported in comparable studies. Trans-nonachlor levels equal or exceed the 19280-81 NPMP national geometric mean at 18 sites (see Table 2). The trans-nonaclor level reported from Manayunk Canal (I-21) is more than two times the 1980-81 NPMP national maximum value. Cis-nonachlor residues equal or exceed the NPMP national geometric mean at five sites: Neshaminy Creek, I-18; Manayunk Canal, I-21; Red Clay Creek, I-25; the Monongahela River, V-41; and the Youghiogheny River, V-40). All of these residues are probably the result of chlordane use.

Hexachlorobenzene (HCB) residues were detected at two sites: Big Elk Creek (III-30) and the Beaver River (V-28). The concentrations at both sites exceeded the 1980-81 NPMP national geometric mean, but were within the ranges reported for other studies in this section of the United States.

Kepone and Mirex - Kepone residues were detected at all five sites sampled. These sites (Bald Eagle Creek, III-13 and III-1C; Spring Creek, III-1B and III-1D; Sayers Dam, III-1A) are located in or near waters which have a long history of kepone contamination. One of the fish from Spring Creek (III-D) displayed vertebral deformities, a reported symptom of kepone exposure. The Pennsylvania Fish Commission has prohibited the harvest of fish from certain areas of Spring Creek. There have been a number of reports of fish with spinal deformities from Sayers Dam (III-1A), downstream of Spring Creek. SCFO biologists have observed black crappies with spinal deformities; however, none were observed during the collection effort for this study. Reports from fishermen indicate that the number of deformed fish in Sayers Reservoir is now very low.

Mirex residues were detected at five sites: Bald Eagle Creek (III-13), Spring Creek (III-1B and III-1D), French Creek (V-14) and Connoquenessing Creek (V-26). All five sites had mirex concentrations which exceed the 1980-81 NPMP national geometric mean. The concentration at Station III-1B was more than four times the 1980-81 NPMP maximum concentration. Fish harvest from sections of this stream is prohibited by the Pennsylvania Fish Commission. Mirex was detected at low levels in French Creek and Connoquenessing Creek. The source(s) are unknown and additional monitoring should be conducted.

Polychlorinated Biphenyls (PCB's) - PCB residues were detected at 40 sampling sites. Nineteen samples had Aroclor 1260 concentrations which exceeded the 180-81 NPMP national geometric mean and one sample (from Red Clay Creek) was more than two times the NPMP maximum value. Fourteen sites had levels above the NAS/NAE criteria, for the protection of piscivorous wildlife.

Red Clay

Aroclor 1254 concentrations exceeded the 1980-81 NPMP national geometric mean at ten sites, while seven are higher than the NAS/NAE criteria.

Aroclor 1242 residues were present in samples from Slab Cabin Run (III-1E), Spring Creek (III-1D) and Bald Eagle Creek (III-1C). Samples from Spring Creek above Slab Cabin Run did not have Aroclor 1254. The presence of Aroclor 1242 suggests recent PCB contamination of Slab Cabin or Thompson Run. Twenty-two sites had PCB levels which exceeded the NAS/NAE criteria. Further work regarding PCB residues in relation to mink, otters and other fish-eating wildlife should be conducted in consultation with the Pennsylvania Game Commission and other appropriate agencies.

Toxaphene was detected at one site, Spruce Creek (III-2A). The concentration was below the 1980-81 NPMP national geometric mean but exceeds the NAS/NAE criteria for the protection of piscivorous wildlife. Further monitoring of toxaphene is warranted.

The Pennsylvania Game Commission (Sitlinger, 1983, p. 3) indicates that there are 153 birds and mammals that occur in or near aquatic environments and consume aquatic organisms. These animals represent 48% of the mammals and 54% of the birds in Pennsylvania. Of these, three are federally-designated endangered species, one is state-designated endangered, four are state-designated threatened and ten are state species of special concern. Future monitoring should incorporate other aquatic and riparian species that are

closely associated with fish, including species previously used in laboratory studies and for which dosage/response information exists.

In addition to further monitoring of the problem waters identified in this study, the following additional waters have been suggested for contaminant monitoring: West Branch of the Susquehanna River above the confluence with Sinnemahoning Creek; Sinnemahoning Creek; West Branch of the Susquehanna below the confluence with Bald Eagle Creek and below the confluence with Chillisqueque Creek; lower Susquehanna River representing drainage areas for the agricultural areas of Lancaster and York Counties; the Bushkill or other waterway in the Pocono region, representing an area of development and urbanization; the upper part of the Kiskiminetas River or the Conemaugh/Loyalhanna drainages; the Lackawanna River above its confluence with the Susquehanna; and the Susquehanna River below Berwick.

JUNE 1984

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# CHESTER COUNTY HEALTH DEPARTMENT, in conjunction with the CHESTER COUNTY MUSHROOM TASK FORCE



# Surface Water Quality Assessment of Big Elk, White Clay & Red Clay Creeks in Southern Chester County

BCM BCM Eastern Inc.
Engineers, Planners and Scientists
One Plymouth Meeting • Plymouth Meeting, PA 19462 • Phone: (215) 825-3800

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# SURFACE WATER QUALITY ASSESSMENT OF THE BIG ELK, WHITE CLAY, AND RED CLAY CREEKS IN SOUTHERN CHESTER COUNTY

FOR

CHESTER COUNTY HEALTH DEPARTMENT
WEST CHESTER, PENNSYLVANIA

JUNE 1984


PREPARED BY

"non responsive based on revised scope"

SENIOR SCIENTIST/PLANNER

APPROVED BY

"non responsive based on revised scope"

VICE PRESIDENT

BCM EASTERN INC.
ONE PLYMOUTH MEETING MALL
PLYMOUTH MEETING, PENNSYLVANIA 19462

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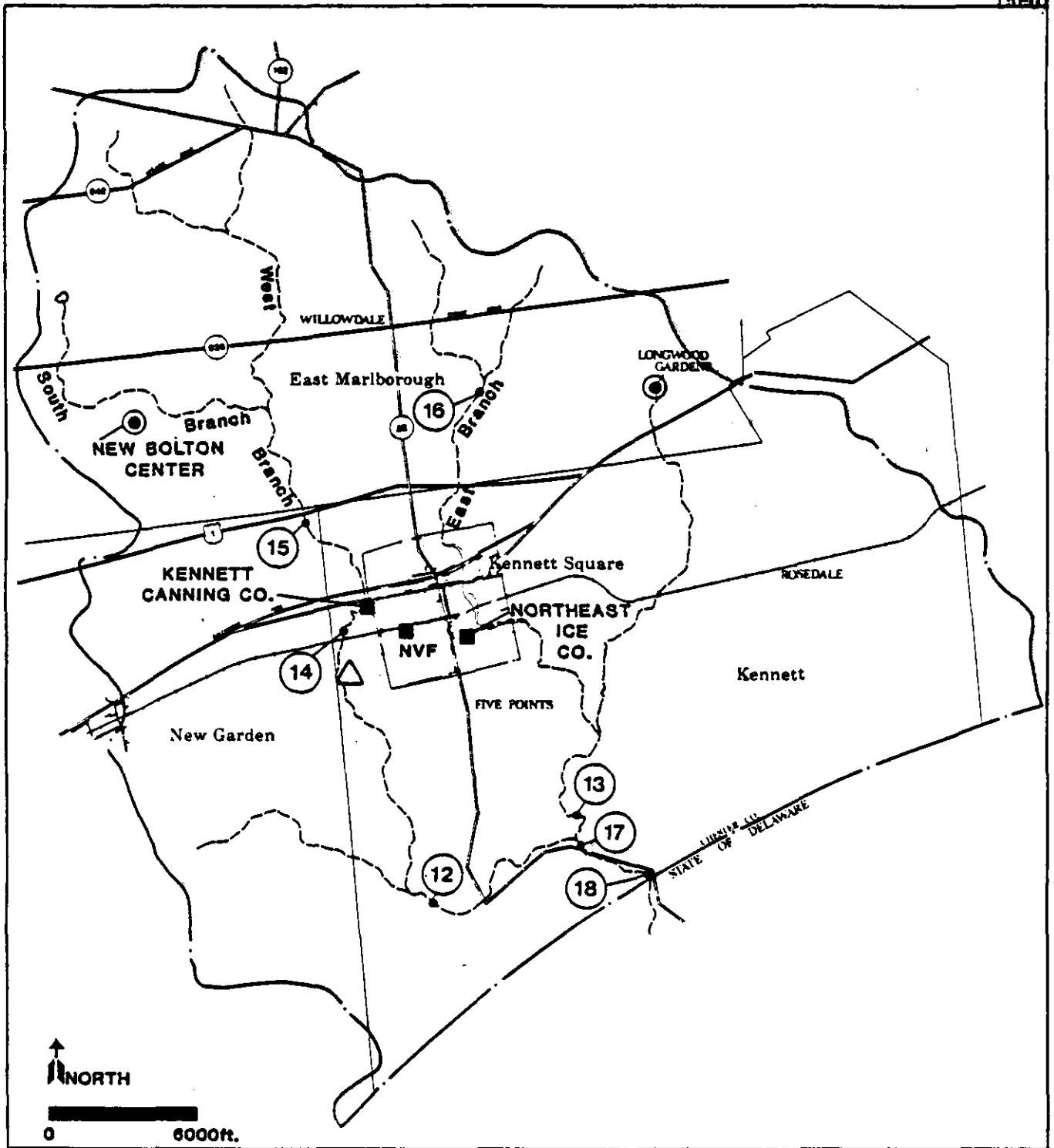


Legend

- (8) Primary Station Location
- ◉ Private/Institutional Sewage Treatment Plants
- △ Municipal STP
- ■ Major Industrial Discharge

Note: Refer to Table2-2for Sampling Station description.
Source: Chester County Planning Dept., 1984
Chester County Health Dept., 1984

Red Clay Creek Basin

Figure 2-3

LOCATION OF WATER QUALITY SAMPLING STATIONS & MAJOR POINT SOURCES

Stations 13 and 14 on the Red Clay Creek are the only two stations for which base/neutral extractable analyses have been done. These compounds are considered unusual and their presence may be the result of a 1980 fire that occurred at the Kennett Square junkyard and dump located in the vicinity of station 14. The massive firefighting operation created significant leaching and runoff of water in the dump and adjacent former landfill. In fact water samples collected by PADER on 5/30/80 after the fire was estinguished, reveal many similiar compounds to those found in the sediments.

## 3.8 FORMALDEHYDE

The volatile organic compound formaldehyde was consistently found in all of the 16 Chester County Mushroom Study stations across all three watersheds. The highest values were found in the White Clay and Red Clay Creeks.

TABLE 3-6
1983 CONCENTRATION FOR FORMALDEHYDE
IN STREAM SEDIMENTS (1983)
(mg/kg)

| Station | Value | Station | Value |
|---|---|---|---|
| Bio Elk 1 | 1.25 | 9 | 2.7 |
| 2 | .35 | 10 | .35 |
| 3 | .95 | 11 | 5.4 – E.BR. White Clay |
| 4 | .95 | 12 | 2.15-W.Br. Red Clay |
| White Clay 5 | .35 | Red Clay Ck 13 | 3.6-E.Br |
| 6 | .95 | 14 | 3.3-W.Br |
| 7 | 1.25 | 15 | 2.5-W.Br. |
| 8 | 3.3 | 16 | 3.3 – E.Br |
| | | | 14.85 |

Source: Chester County Health Department 1983 Mushroom Industry Management Study.

There are no specific standards or criteria for formaldehyde found in sediment. There are conflicting schools of thought regarding the environmental fate of formaldehyde; many researchers believe that since formaldehyde is a volatile organic it would not persist in sediments at all. Other investigators believe that once formaldehyde enters the sediment it becomes relatively protected from normal degradation pathways since it is not exposed to air or sunlight. In addition, bacterial degradation of the compound is limited due to formaldehyde's toxicity. In Appendix B are a series of computer plots by watershed for the 1983 formaldehyde data. These computer plots show concentration versus station (upstream to downstream) for each watershed. The Big Elk Creek shows a higher value (1.25) at station 1 which is on the West Branch of Big Elk Creek. The concentrations decrease downstream and level off at just under 1.0 ppm. The White Clay Creek shows more variability in values for formaldehyde as you proceed downstream. A value over 3.0 ppm occurs in the upper watershed decreasing to values less than 1.0 ppm in the middle reaches and peaking to over 5.0 at station 11 located on the East Branch. Values for the Red Clay Creek are also high on the average with highest values occurring at stations 14, 16 and 13 (3.3, 3.3, 3.6 ppm, respectively).

# 4.0 CONCLUSIONS AND RECOMMENDATIONS

## 4.1 MAJOR FINDINGS

Water Quality Monitoring Program:

- The County's water quality program provides good spacial coverage and has helped Chester County monitor and improve water quality conditions in Chester County streams. When problems are noted at the sampling stations, County personnel attempt to trace the problem back upstream where more intensive field work can pinpoint a specific pollution source.

- This assessment study has provided the first systematic approach to assembly and consolidation of the various available chemical and physical water quality for Southern Chester County.

- Failure of the various agencies over time to record stream flow data at each station when water quality is sampled limits the usefulness of the data. Water quality is such a strong function of flow that determining trends and cause-effect relationships from water quality data only is often infeasible.

Water Quality Assessment and Identification of Problems:

- Overall water quality across all three watersheds is relatively good, particularly in the Elk Creek basin.

- There is evidence of water quality degradation in stream reaches below wastewater treatment plants and large urbanized areas and at specific stations (see Table 4-1). Aquatic life may be endangered in some locations due to episodic pesticide, herbicide and PCB pollution.

ECM

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(Red)

TABLE 4-1
STATIONS WITH POTENTIAL WATER QUALITY PROBLEMS

| Station No. | Parameters of Concern |
|---|---|
| **Big Elk Creek** | |
| 1 | Formaldehyde |
| 3 | Formaldehyde |
| 4 | Formaldehyde |
| **White Clay Creek** | |
| 6 | Formaldehyde |
| 7 | Total Phosphorus and Formaldehyde |
| 8 | Formaldehyde |
| 9 | Formaldehyde |
| 11 | Formaldehyde |
| 21 | Lindane and Diazinon |
| **Red Clay Creek** | |
| 12 | Formaldehyde, DDE, and Lindane |
| 13 | Formaldehyde, Base/Neutral Compounds |
| 14 | Total Phosphorus, Formaldehyde, Base/Neutral Compounds, Lindane, DDE and DDT |
| 15 | Total Phosphorus and Formaldehyde |
| 16 | Formaldehyde |
| 17 | Total Phosphorus, Lindane and Diazinon |
| 18 | Total Phosphorus |

- Highest levels (above detection) of pesticides, herbicides, formaldehyde and PCBs were found in the stream sediments. Erosion and siltation are significant problems in many stream reaches and complicates the determination of pollution source.

- The presence of PCBs is indicative of industrial pollution.

Cause-Effect Relationships:

- Landuse and water quality relationships are difficult to assess without additional information, particularly detailed land use mapping and the availability of water quality data that brackets major land uses. At their present locations, most stations cover

large subareas and mixed land uses making cause-effect assessments very tentative.

- Identifying impacts specifically from mushroom farming operations is difficult. However, because the mushroom industry uses large quantities of pesticides/insecticides and sterilants such as formaldehyde, they should be considered a potential contributing source of these pollutants. The widespread distribution of mushroom farming in Chester County increases the liklihood that it is a potential source.

## 4.2 RECOMMENDATIONS

Water Quality Monitoring Program:

- Wherever available, stream flow data should be collected along with the physical and chemical parameters. (USGS has recently reinstated their stream flow data collection in Chester County; therefore, these data should be incorporated in all future sampling.) If funding limitations prevent flow monitoring, a least estimates of stream flow conditions during sampling events should be made by extrapolating flow data from gauged watersheds to the sampling station in question.

- Data should be consolidated and coordinated in a central data management system (computerized if possible). Only long-term data were assembled and consolidated for this evaluation because of time and budget constraints. Additional data could be added. The more organized and centralized system will make future water quality monitoring/tracking much simpler and efficient and the availability of this data in a computer data base will allow the Health Department to perform other trend analyses. Recommended future analyses would include correlations of pollutants with stream flow data to determine loadings and the determination of seasonal patterns in certain water quality parameters.

The computerized data base management system established as part of this study effort could be used as a means of centralizing water quality data. The statistical summaries and data plots presented in the appendices could be easily updated using the computer system. The correlation analyses mentioned above could also be readily completed and plotted with the system.

- The County's water quality monitoring program has served Chester County's needs well in the past. The sampling stations were established in the 1970s to track point source problems such as municipal and industrial discharges. However, the utility of the program could be improved, especially for evaluating trends, specific land use impacts, and causes of water quality problems. It is recommended that the Health Department reevaluate the overall goals of the water quality monitoring system in light of changes that have occurred since the program was established. For example, the County may wish to reassign some of the existing sampling stations to bracket major land uses. In addition, the value of physical and chemical water quality data could be improved if biological data (e.g., macroinvertebrates) were collected, as is currently practiced by USGS.

  As part of this reassessment, the County should consider the benefits of more intensive, short-term surveys on specific stream stretches. Such monitoring, which includes biological assessment as well as chemical/physical sampling, offers better understanding of stream dynamics and cause-effect relationships than the traditional program of periodic chemical sampling at fixed stations.

Cause-Effect Relationships:

- No conclusive statements can be made regarding the relationship between land use and water quality data. To make interpretations of contributing sources more effective, it is recommended that major land

uses in the vicinity of problem stations be bracketed by additional water quality stations. Additional field investigations should be made of watershed land uses. This information may be coordinated with the Planning Department to update their land use base.

- Pesticides and formaldehyde have been found in significant amounts in the water column and stream sediments along some stream segments. In their use of pesticides and sterilants, the mushroom industry may be a potential pollution source. Studies reported by others have linked various components of mushroom farming operations to stream pollution but limited data generally prevents conclusive pinpointing of problems. It is recommended that a well-designed study be made of stormwater runoff from various major land uses, including typical mushroom operations.

Water Quality Assessment and Problems:

- More intensive water quality evaluations should be conducted on reported problem stretches. These intensive evaluations should be well designed with specific goals and water quality problems in mind. The program could consist of an intensive one-week long analysis of those stations during low flow conditions. Evaluation of another week during high flow conditions may also be warranted as well as diurnal oxygen studies. These intensive surveys should include a biological assessment as well as chemical water quality testing.

- The County should consider replacing the extensive priority pollutants testing with a TOX toxicity test. Based on the results of this broader test, more specific testing could be done. Such a program could save significant costs without adversely effecting the quality of the monitoring program.

- Because of the high natural erodibility of the local soils, the mechanisms of erosion and sediment transport should be investigated to determine the source and movement of the contaminated stream sediments. This information could help determine how serious the sediment pesticide contamination problem is with respect to aquatic and human health.

- The persistence and fate of the many base/neutral extractable compounds found at stations 13 and 14 on the Red Clay should be investigated to determine the extent of the impact to aquatic life and other downstream uses.

POLYCARBONATE RESINS

POLYCARBONATE RESINS COMPLYING WITH §177.1580 (POLYCARBONATE RESINS) CLEARED UNDER §177.1200 (CELLOPHANE) AND §177.1400 (WATER-INSOLUBLE HYDROXYETHYL CELLULOSE FILM) (FR SEPT. 12, 1964).

CLEARED UNDER §177.1580 (POLYCARBONATE RESINS) AS ARTICLES OR COMPONENTS OF ARTICLES FOR USE IN PRODUCING, MANUFACTURING, PACKING, PROCESSING, PREPARING, TREATING, PACKAGING, TRANSPORTING, OR HOLDING FOOD. POLYCARBONATE RESINS ARE POLYESTERS PRODUCED BY: (1) THE CONDENSATION OF 4,4'-ISOPROPYLIDENEDIPHENOL AND CARBONYL CHLORIDE, TO WHICH MAY HAVE BEEN ADDED CERTAIN OPTIONAL ADJUVANT SUBSTANCES REQUIRED IN THE PRODUCTION OF THE RESINS; (2) THE REACTION OF MOLTEN 4,4-ISOPROPYLIDENEDIPHENOL WITH MOLTEN DIPHENYL CARBONATE IN THE PRESENCE OF 4,4'-ISOPROPYLIDENE DISODIUM SALT (FR MAY 27, 1967); OR (3) THE CONDENSATION OF 4,4'-ISOPROPYLIDENEDIPHENOL, CARBONYL CHLORIDE, AND 0.5% WEIGHT MAXIMUM OF αA,α6-BIS(6-HYDROXY-M-TOLYL)MESITOL TO WHICH MAY HAVE BEEN ADDED OPTIONAL SUBSTANCES REQUIRED IN THE PRODUCTION OF BRANCHED POLYCARBONATE RESINS (FR MAY 13, 1970). THE RESINS ARE USED UNDER THE FOLLOWING PRESCRIBED CONDITIONS: (A) SPECIFICATIONS: POLYCARBONATE RESINS CAN BE IDENTIFIED BY THEIR CHARACTERISTIC INFRARED SPECTRUM; (B) EXTRACTIVES LIMITATIONS: THE POLYCARBONATE RESINS TO BE TESTED SHALL BE GROUND OR CUT INTO SMALL PARTICLES THAT WILL PASS THROUGH A U.S. STANDARD SIEVE NO. 6 AND THAT WILL BE HELD ON A U.S. STANDARD SIEVE NO. 10: (1) POLYCARBONATE RESINS, WHEN EXTRACTED WITH DISTILLED WATER AT REFLUX TEMPERATURE FOR 6 HOURS SHALL YIELD TOTAL EXTRACTIVES NOT TO EXCEED 0.15% BY WEIGHT OF THE RESINS; (2) POLYCARBONATE RESINS WHEN EXTRACTED WITH N-HEPTANE AT REFLUX TEMPERATURE FOR 6 HOURS SHALL YIELD TOTAL EXTRACTIVES NOT TO EXCEED 0.15% BY WEIGHT OF THE RESINS; (3) POLYCARBONATE RESINS WHEN EXTRACTED WITH 50% (BY VOLUME) ETHYL ALCOHOL IN DISTILLED WATER AT REFLUX TEMPERATURE FOR 6 HOURS SHALL YIELD TOTAL EXTRACTIVES NOT TO EXCEED 0.15% BY WEIGHT OF THE RESINS; (C) THE OPTIONAL ADJUVANT SUBSTANCES REQUIRED IN THE PRODUCTION OF THE RESINS MAY INCLUDE SUBSTANCES GENERALLY RECOGNIZED AS SAFE IN FOOD, SUBSTANCES USED IN ACCORDANCE WITH A PRIOR SANCTION, AND THE FOLLOWING:

P-TERT-BUTYLPHENOL.
CHLOROFORM.
ETHYLENE DICHLORIDE.
HEPTANE.
METHYLENE CHLORIDE.
MONOCHLOROBENZENE, AT LEVELS NOT IN EXCESS OF 500 P.P.M. AS A RESIDUAL SOLVENT IN FINISHED RESIN.
PHENOL
PYRIDINE.
TOLUENE, AS A RESIDUAL SOLVENT IN FINISHED RESIN AT A LEVEL NOT TO EXCEED 800 P.P.M.
TRIETHYLAMINE.

Petition withdrawn March 9, 1966, would have amended §177.1580 (POLYCARBONATE RESINS) to clear use of monochlorobenzene.

General Electric Petition Oct. 29, 1985, would amend §177.1580 (POLYCARBONATE RESINS) to clear use of resins produced by condensation of 4,4'-isopropylidenediphenol, carbonyl chloride, terephthaloyl chloride, and isophthaloyl chloride.

FDA proposal April 9, 1976, would delete listing for chloroform.

POLYESTER FIBER

POLYESTER FIBER PRODUCED BY CONDENSATION OF ONE OR MORE OF THE ACIDS LISTED IN §177.2420 (CROSS-LINKED POLYESTER RESINS) WITH ONE OR MORE OF THE ALCOHOLS LISTED IN §177.1420 CLEARED UNDER §177.2420 AS A REINFORCEMENT (FR JUNE 9, 1965).

POLYESTER RESIN

POLYESTER RESIN PREPARED FROM 2,2-DIMETHYL-1,3-PROPANEDIOL AND TETRAHYDROPHTHALIC ACID IS CLEARED UNDER §175.105 (ADHESIVES) (FR JUNE 29, 1965).

POLYESTER RESINS, INCLUDING ALKYD-TYPE, DESCRIBED IN §175.300 (RESINOUS AND POLYMERIC COATINGS) ARE ALSO CLEARED UNDER §175.105 (ADHESIVES), §175.380 (XYLENE-FORMALDEHYDE RESINS CONDENSED WITH 4,4'-ISOPROPYLIDENEDIPHENOL EPICHLOROHYDRIN EPOXY RESINS), §175.390 (ZINC-SILICON DIOXIDE MATRIX COATINGS), §176.170 (COMPONENTS OF PAPER AND PAPERBOARD IN CONTACT WITH AQUEOUS AND FATTY FOODS), AND §177.1210 (CLOSURES WITH SEALING GASKETS FOR FOOD CONTAINERS).

POLYCHLORINATED BIPHENYLS

TEMPORARY TOLERANCES ARE ESTABLISHED UNDER §109.30 (POLYCHLORINATED BIPHENYLS) OF 1.5 P.P.M. IN MILK (FAT BASIS) AND MANUFACTURED DAIRY PRODUCTS (FAT BASIS); 3 P.P.M. IN POULTRY (FAT BASIS); 0.3 P.P.M. IN EGGS; 0.2 P.P.M. IN FINISHED ANIMAL FEED FOR FOOD PRODUCING ANIMALS (EXCEPT FEED CONCENTRATED, FEED SUPPLEMENTS, AND FEED PREMIXES); 2 P.P.M. IN ANIMAL FEED COMPONENTS OF ANIMAL ORIGIN, INCLUDING FISHMEAL AND OTHER BY-PRODUCTS OF MARINE ORIGIN AND IN FINISHED ANIMAL FEED CONCENTRATES, SUPPLEMENTS AND PREMIXES INTENDED FOR FOOD PRODUCING ANIMALS; 0.2 P.P.M. IN INFANT AND JUNIOR FOODS. A 2 P.P.M. TOLERANCE IN FISH AND SHELLFISH (EDIBLE PORTION) (THE EDIBLE PORTION OF FISH EXCLUDES HEAD, SCALES, VISCERA AND INEDIBLE BONE) HAS BEEN STAYED PENDING REVIEW; A 5 P.P.M. TOLERANCE IN IN EFFECT PENDING COMPLETION OF THAT REVIEW. A 10 P.P.M. TOLERANCE IN PAPER FOOD-PACKAGING MATERIAL INTENDED FOR OR USED WITH HUMAN FOOD, FINISHED ANIMAL FEED AND ANY COMPONENTS INTENDED FOR ANIMAL FEEDS, UNLESS PAPER FOOD-PACKAGING MATERIAL IS SEPARATED FROM FOOD BY A FUNCTIONAL BARRIER WHICH IS IMPERMEABLE TO THE MIGRATION OF PCB'S HAS ALSO BEEN STAYED PENDING REVIEW.

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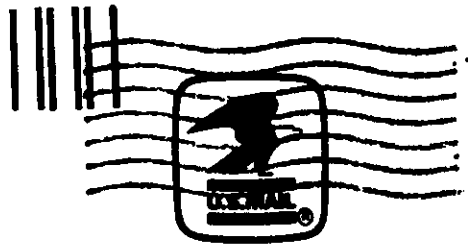

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